

Attitudes toward beef and vegetarians in Argentina, Brazil, France, and the USA

Matthew B. Ruby¹

Marle S. Alvarenga²

Paul Rozin¹

Teri A. Kirby³

Eve Richer¹

Guillermina Rutzstein⁴

1 University of Pennsylvania - USA

2 University of São Paulo - Brazil

3 University of Washington - USA

4 University of Buenos Aires - Argentina

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CORRESPONDING AUTHOR:

Dr. Matthew Ruby

University of Pennsylvania

3720 Walnut St, Office B13

Philadelphia, PA 19104

mattruby@psych.upenn.edu

+1-215-898-7632

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Abstract

Meat is both the most favored and most tabooed food in the world. In the developed world, there is a tension between its high nutritional density, preferred taste, and high status on the one hand, and concerns about weight, degenerative diseases, the ethics of killing animals, and the environmental cost of meat production on the other hand. The present study investigated attitudes toward beef, and toward vegetarians, among college students in Argentina, Brazil, France, and the USA. Across countries, men were more pro-beef, in free associations, liking, craving, and frequency of consumption. By country, Brazil and Argentina were generally the most positive, followed by France and then the United States. Ambivalence to beef was higher in women, and highest in Brazil. Only Brazilian and American women reported frequent negative associations to beef (e.g. “disgusting”, “fatty”). Overall, most students had positive attitudes to beef, and the attitude to vegetarians was generally neutral. America and Brazilian women showed some admiration for vegetarians, while only French men and women had negative attitudes to vegetarians. In spite of frequent negative ethical, health, and weight concerns, in the majority of the sample, liking for and consumption of beef was maintained at a high level.

Key words: attitudes, beef, culture, gender, meat, preferences, vegetarianism

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Introduction

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In the developed world, many people have ambivalent attitudes toward meat. As a concentrated source of protein, fat, and minerals, meat usually occupies a favored position in the hierarchy of foods (e.g., Adams, 1990; Allen & Ng, 2003; Rozin et al., 2012; Twigg, 1979), and in many societies, the ability to consume large amounts of meat has traditionally been a marker of wealth and social power (e.g., Fiddes, 1991). Twigg (1979) argues that in many cultural contexts, neither all food nor all meats are created equal—red meat is at the top of the pile, followed by white meat, fish, dairy, eggs, and at the very bottom, fruits and vegetables. Red meat is thought to occupy this position in the food hierarchy because it symbolizes power, strength, and human dominance over nature through its visible blood content and associations with hunting, a typically male-dominated activity (e.g., Adams, 1990; Fiddes, 1991; Sobal, 2005).

Although meat is held in such high regard in most societies, animal flesh is more likely than vegetable matter to contain harmful bacteria and parasites (Schantz & McAuley, 1991), and it is also the most frequently tabooed category of food (e.g., Fessler & Navarrete, 2003; Rozin, 1987; Simoons, 1994). In many Western societies, ambivalence toward eating commonly consumed animals appears to be driven by several other factors. One such source of conflict (and contention) is concern about the effects of high meat consumption on health. On the one hand, on a country level, meat consumption is positively related to longevity, as nine of the ten most long-lived countries in the world eat a diet high in meat (the exception being Japan, FAOSTAT, 2014), but on the other hand, within developed countries and controlling for various potential confounds, such as socioeconomic status, access to healthcare, smoking, and exercise, many researchers have demonstrated a relationship between meat consumption (particularly processed red meat), and increased mortality, especially due to heart disease (e.g., Fraser, 1999; Huang et al., 2012; Micha, Wallace, & Mozaffarian, 2010; Pan et al., 2012; Rohrmann et al., 2013). As such, for many people, there is a tension between the pleasure of eating meat and concern about one's health (e.g., Becker, Kals, & Fröhlich, 2013; Povey, Wellens, & Conner, 2001; Sparks, Conner, James, Shepherd, & Povey, 2001). Other major sources of concern about meat eating focus on the ethics of raising and killing animals for human consumption, the environmental impact of meat production, and, to a lesser but significant extent, matters of taste and expense (e.g., Audebert, Deiss, & Rousset, 2006; Berndsen & van der Pligt, 2004; Richardson, Shepherd,

93 & Elliman, 1994; Rousset, Deiss, Juillard, Schlich, & Droit-Volet, 2005; Ruby, 2012; Ruby,
94 Heine, Kamble, Cheng, & Waddar, 2013; Singer, 1976; Steinfeld et al., 2006).

95 Presently, we are in the peculiar position that meat, a generally favored and high-status
96 human food, may be declining in popularity in the developed world because of health,
97 environmental, and ethical concerns, while its popularity is increasing in the much larger
98 developing world, as these countries become more affluent (e.g., Larsen, 2012; OECD-FAO,
99 2014).

100 **Attitudes Toward Vegetarians**

101 In accordance with meat ambivalence, a modest percentage of people in the world are
102 vegetarians. There is not a widely accepted definition of vegetarianism, and figures for the
103 incidence of vegetarianism are not available for many countries. Almost certainly, India has the
104 highest percentage of vegetarians, with estimates ranging from 20-42% (see Ruby, 2012 for a
105 review). In the four countries of interest in the present study, estimated prevalence of
106 vegetarianism, defined as complete avoidance of meat (that is, animal products other than dairy
107 and eggs) ranges from 8% in Brazil (Ibope, 2012), 5% in the USA (Gallup, 2012), and less than
108 2% in France (European Vegetarian Union, 2007). There is no available official estimate for
109 Argentina, the world leader for beef consumption per capita, but the Argentina Society of
110 Nutrition estimates a prevalence of 1-2% (Blanco, 2014).

111 Research on attitudes toward vegetarians is relatively scarce, and comes primarily from
112 the United States and Canada. In the first study measuring perceptions of vegetarians, Sadalla
113 and Burroughs (1986) found that US-Americans viewed vegetarians as being pacifist,
114 hypochondriacal, liberal, weight-conscious, and recreational drug-users. When asking
115 vegetarians how they saw themselves, a similar schema emerged, in that they perceived
116 themselves to be intellectual, non-competitive, weight-conscious and sexy, with a tendency to
117 use recreational drugs. More recently, in a sample of university students in the southeast United
118 States, Chin, Fisak, and Sims (2002) found that attitudes toward vegetarians were generally
119 positive, with the caveat that their sample was mostly female (81%) and liberal (65%), echoing
120 the results of Walker (1995), who found that female teenagers in the USA held more positive
121 attitudes toward vegetarians than did their male peers.

122 In yet another study conducted in the USA, Rozin, Hormes, Faith, and Wansink (2012)
123 found that participants rated targets whose favorite foods were “vegetable stir fry and other

124 vegetable dishes” as less masculine and more feminine than targets whose favorite foods were
125 “steak and other kinds of beef”, and in both Canadian and US-American samples, Ruby and
126 Heine (2011) found that, after controlling for perceived healthiness of diet, people perceived
127 vegetarians to be more moral and less masculine than omnivores. In another a sample of students
128 in the USA, Minson and Monin (2012) found that omnivores viewed vegetarians as virtuous but
129 weak; furthermore, the extent to which they anticipated moral reproach from vegetarians
130 predicted how much they derogated them (i.e., rating of weakness).

131 A recent set of studies by Rothgerber (2014) indicates that simply reading about
132 vegetarians can trigger a sense of guilt and dissonance in some meat eaters, leading them to
133 engage in a series of dissonance reduction strategies, such as demoralizing commonly eaten
134 animals, denying animals’ capacity for pain, and more strongly justifying their meat
135 consumption. Paradoxically, reading about a dedicated vegetarian (who never eats meat or fish,
136 as opposed to an imposter who claims to be vegetarian but frequently eats meat and fish) led
137 participants to report less frequent beef consumption, and more frequent consumption of
138 vegetarian meals– suggesting that they may have distorted their reports in an attempt to feel
139 better about their dietary choices, as simply reading a vignette could not possibly have affected
140 people’s actual past eating behavior.

141 Attitudes toward vegetarians in Brazil, Argentina, and France have not been examined, to
142 our knowledge, but on the basis of government regulations that recently required all public
143 school lunches to contain animal products, with a minimum of 20% of meals containing meat
144 and 20% containing fish, and the remainder containing egg, cheese, or offal, it appears that
145 France (French law) is unsympathetic to vegetarians (e.g., Haurant, 2011). Given the importance
146 of beef in Brazil and Argentina, and the structural opposition to people following vegetarian
147 diets in France, laypeople’s attitudes toward vegetarians in these cultural contexts remains an
148 important and underexplored topic.

149 **Gender and Meat**

150 In many Western societies, vegetarian women greatly outnumber vegetarian men (e.g.,
151 Amato & Partridge, 1989; Fraser et al., 2000; Santos & Booth, 1996; Worsley & Skrzypiec,
152 1998) and even among Western non-vegetarians, women eat considerably less meat than men
153 (e.g., Beardsworth et al., 2002; Fraser, Welch, Luben, Bingham, & Day, 2000; Gossard &
154 York, 2003; National Public Health Institute, 1998; Richardson et al., 1993; Rimal, 2002). In

155 many cultural contexts, there are also large gender differences in attitudes toward meat.
156 Compared to their female peers, men in England (Beardsworth et al., 2002) and Norway (Fagerli
157 & Wandel, 1999) are more likely to believe that a healthy diet should always include meat.
158 When justifying their consumption of meat, Rothgerber (2013) found that American women
159 were more likely to use indirect methods (e.g., dissociating meat from its animal origins,
160 avoiding thinking about animal slaughter), whereas men were more likely to use direct methods
161 (e.g., claims that meat is necessary for good health, appeals to taste, human dominance over
162 nature).

163 Among a sample of American college students, Mooney and Walbourn (2001) found that
164 meat is the most commonly avoided food among female participants, and in another sample of
165 American college students, Rozin et al. (2012) found that women were more likely than men to
166 avoid eating red meat. Echoing many previous arguments about the special status of red meat
167 (e.g., Adams, 1990; Twigg, 1979; Fiddes, 1991), Rousset et al. (2005) maintain that, generally
168 speaking, “men feel hedonic pleasure in seeing and eating red meat while women experience
169 discomfort” (p. 609). Support for this statement comes from several sources. Kubberød, Ueland,
170 Rødbotten, Westad and Risvik (2002) found that among Norwegian university students, women
171 had more negative attitudes to red meat than did men, and looking at a range of different meats,
172 women disliked meats more the redder and “meatier” they were (e.g., beef, lamb). In this study,
173 and another study of Norwegian high school students (Kubberød, Ueland, Tronstad & Risvik,
174 2002), the sight of blood in red meat especially invoked images of animal death and disgust in
175 women, with similar results emerging in a sample of teenage girls in England (Kenyon & Barker,
176 1998), and in random samples of adults from the USA, UK, France, Germany, Italy, and
177 Switzerland (Ruby, Rozin, & Fischler, in prep).

178 The perceived (un)healthiness of meat appears to be another importance source of
179 ambivalence. Macht et al. (2003) found that German women were more likely to view energy-
180 dense foods as unhealthy and dangerous, and research with Danish (Holm & Møhl, 2000) and
181 South Australian (Lea & Worsley, 2002) samples reveals people’s tendency to view meat as fatty
182 and calorically dense is an important factor in their rejection. Among a sample of adult French
183 women, Audebert, Deiss, and Rousset (2006) found that enjoyment of red meat was positively
184 correlated with beliefs that meat was essential to a balanced diet and good health, and negatively
185 correlated with concern for animal breeding/slaughter practices and the impact of meat on the

186 environment, and Leeman, Fischler, Rozin, and Shields (2011) report more favorable attitudes to
187 the healthiness of meat in continental European than American physicians. As with general
188 attitudes toward beef, and attitudes toward vegetarianism, little is known about possible gender
189 differences in how people relate to meat in Latin America.

190 **Research Questions**

191 We elected to look at the place of beef in life as a function of gender and culture. We
192 selected beef because, in the Western world, it is the quintessential mammal meat. In the path to
193 vegetarianism, beef is often the first animal product to be removed from the diet (e.g.,
194 Beardsworth & Keil, 1991; 1992; Santos & Booth, 1996). In particular, beef is the most
195 commonly consumed mammal meat in Argentina, Brazil, France, and the USA. Well known for
196 its *asado* (barbecue), Argentina is (among countries of 5 million or more people), the highest
197 consumer of beef in the world, at an estimated consumption of 54.9 kg per capita in 2011
198 (FAOSTAT, 2014). That year, Brazil's estimate was 39.1 kg (3rd in the world), the USA
199 consumed 37.0 kg (4th in the world), and France consumed 25.4 kg (10th in the world;
200 FAOSTAT, 2014). These four countries are among the highest producers of beef– as of 2011, the
201 USA produced the most beef in the world (12.0 billion tons), followed by Brazil (#2; 9.0 billion
202 tons), Argentina (#5, 2.5 billion tons) and France (#8, 1.6 billion tons).

203 Despite its culinary and economic importance, little is known about how people relate to
204 beef in major beef-consuming countries, such as Argentina and Brazil. There is little research on
205 the psychology of beef in non-Western countries, and virtually none in South American
206 countries. Beef consumption and attitudes to beef are of particular relevance because of
207 increasing concerns in the developed world about the effects of red meat consumption on health,
208 animal welfare, and environmental sustainability. Gender is of special interest because it is well
209 documented that in the developed world, women have greater concerns about animal welfare, the
210 health effects of diet, and body weight. Beef and other red meats are often high in fat, and hence
211 high in caloric density. Thus, high liking for beef could create challenges for those concerned
212 about maintaining a lower weight. Finally, with food playing an especially important role in
213 French culture, and beef as the “central” food in Argentina, there are interesting questions about
214 how health and ethical concerns about beef impact beef attitudes in these cultures. How does
215 cultural centrality interact with the greater tendency of women, as opposed to men to be
216 concerned about animal welfare, health, and body weight? Does the centrality of beef in

217 Argentina and food in general in France (Rozin et al.,1999) reduce these concerns? Furthermore,
218 one might expect that countries with a greater focus on beef (or meat in general) might be more
219 hostile to those who reject these focal foods (vegetarians). In the present study, we assessed beef
220 attitudes with free associations to “beef”, liking, desire to eat, and consumption of beef, as well
221 as attitudes toward vegetarians, among university students in Brazil, Argentina, France, and the
222 USA. Given the relative lack of prior research in this domain, we conducted the study in an
223 exploratory fashion, without explicit hypotheses.

224 **Method**

225 **Participants**

226 From late 2010 to 2012, as part of a larger study on attitudes toward food, exercise, and
227 the body, we recruited a total of 1,695 participants from universities in four countries to take part
228 in “a survey on body image and attitudes toward food and physical activity.”

229 304 participants were students from the University of Buenos Aires in Argentina (84%
230 women, $M_{age} = 23.6$, $SD_{age} = 2.89$; 3.0% vegetarian/vegan), and were informed of the study
231 through advertisements in psychology and anthropology classes, and via a post on the Facebook
232 page of the university’s psychology group, which was accompanied by a request for students to
233 share the post. 583 participants were students from the University of São Paulo in Brazil (62%
234 women, $M_{age} = 21.3$, $SD_{age} = 2.46$; 3.9% vegetarian/vegan), and were informed of the study via
235 an email sent through the university’s academic listservs. 441 participants were students from the
236 Université de Nantes in France (62% women, $M_{age} = 21.6$, $SD_{age} = 1.46$; 0.2% vegetarian/vegan),
237 and were informed of the study via an email sent to all students of the Audencia Nantes School
238 of Management. The remaining 367 participants were students from the University of
239 Pennsylvania (UPenn) in the USA (65% women, $M_{age} = 21.5$, $SD_{age} = 3.21$; 5.2%
240 vegetarian/vegan), and were informed of the study via announcements in introductory and social
241 psychology courses, and via an email to all graduate students at the university. All participants
242 completed the survey on a voluntary basis; in keeping with local norms, undergraduate students
243 at UPenn received course credit for their participation, and graduate students at UPenn were
244 entered into a cash lottery with a \$100 award to the winner. The US sample was intentionally
245 collected from both graduates and undergraduates for two reasons: 1) In the US, many
246 undergraduates live in dormitories, and we wanted a good representation of US students living

247 off campus, as is the case in the other countries; 2) US undergraduates are somewhat younger
248 than undergraduates from the other countries.

249 To guard against careless responding and to ensure more representative cross-cultural
250 comparisons, we systematically excluded data from any participants who had either left more
251 than 30% of the questionnaire blank (Argentina: 42, Brazil: 95, France: 67, USA: 13), were
252 outside the age range of 18 – 30, or who did not specify their age (Argentina: 55, Brazil: 50,
253 France: 6, USA: 43), did not specify their gender (Argentina: 19, Brazil: 1, France: 0, USA: 9),
254 or were born outside of their university's country or had lived the majority of their life since age
255 10 outside of said country (Argentina: 5, Brazil: 2, France: 18, USA: 64).

256 **Materials**

257 An initial questionnaire was developed in English and pilot-tested with university
258 students in the USA. The questionnaire was then translated by native speakers of the relevant
259 languages into Brazilian Portuguese, Argentine Spanish, and French. Back translation into
260 English was done by a different set of bilingual translators, and discrepancies were resolved via
261 discussion between the translators.

262 The measures of relevance to this study assessed participant attitudes toward beef and
263 toward vegetarians, and the relation of these measures to demographic variables. Other
264 measures, not included in this report, explored body image, portion size, and general attitudes
265 toward food, eating, and exercise. The questionnaire was hosted on SurveyMonkey.com.

266 To assess attitudes toward beef, participants were asked to write down the first three
267 words that come to mind when they think of beef (or *carne vermelha*, *carne*, or *boeuf* in
268 Brazilian Portuguese, Argentine Spanish, and French, respectively). This was the second item of
269 the questionnaire, the first being a free association to the word “chocolate”, in order to obtain
270 participants' spontaneous responses without potential interference from other questionnaire
271 items, and without immediately indicating our focused interest on beef. After completing the free
272 associations, participants were asked to assign each word a positive, negative, or neutral value
273 (+1, 0, or -1, respectively).

274 Next, participants indicated how much they liked beef, on a scale of 0 (not at all) to 100
275 (one of your favorite foods in the world), and to indicate how often they have such a strong
276 desire for beef that they go out of their way to obtain it (1 = never, 2 = once/twice, 3 =

277 occasionally, 4 = often, 5 = almost daily). To assess beef consumption, participants were asked
278 to indicate how many times a month they eat beef.

279 To assess attitudes toward vegetarians, participants indicated, on a seven-point scale (1 =
280 disagree strongly, 4, neither agree nor disagree, 7 = agree strongly), their agreement/
281 disagreement with the following items: “I admire vegetarians”, “Vegetarians bother me”, and “I
282 would prefer to date a vegetarian”. To facilitate interpretation of results, we recoded these data to
283 the metric of (-3 = disagree strongly, 0 = neither agree nor disagree, 3 = agree strongly).

284 At the end of the survey, participants provided a range of demographic data.

285 **Data Analysis**

286 For the qualitative data, we calculated the frequency of the words that came to mind
287 when participants were prompted to free associate to the word “beef”, using the first association
288 for each participant. We list the top 10 free associations by gender and group in Table 1, using a
289 cutoff of words that were reported by 3 or more participants. This strategy shortens the list for
290 Argentine men, which was by far the smallest group. The list represents close to raw
291 associations; we only combined clearly similar words (e.g., fat, fatty; burger, hamburger;
292 delicious, good, tasty; bad, gross, yuck, disgusting; corpse, death, dead).

293 For the quantitative data, to provide a quick overview of each set of results, and to help
294 mitigate the gender imbalance in the Argentine sample (84% women, vs. 62-65% women in the
295 other three cultures), for each measure we: 1) describe the two highest and lowest groups; 2)
296 analyze the data via a series of one-way logistic regressions (for binary outcomes) or ANOVAs
297 using Type I sums of squares (for non-binary outcomes). As our group sizes were unequal and
298 their variances were heterogeneous, to test the significance of country-level differences within
299 each gender, we used the Games-Howell post-hoc test. Finally, we examine the correlations
300 between all of our outcome variables.

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302 **Results**

303 **Free Associations to ‘Beef’**

304 The most frequent words (measured in terms of number of groups for which they
305 appeared in the top 10) were tasty/good (all 8 groups); cow (7 groups), fat, juicy, red, and steak
306 (5 groups). Blood, barbeque, disgusting/bad, and meat were present in 4 groups.

307 Most common in both Brazil and Argentina was barbecue (*asado, churrasco*). In both of
 308 these countries, this carries the implication of socializing and sharing the meal with others.
 309 The most common in France was meat (*viande*), followed by steak, and the most common word
 310 in USA was cow, followed by meat. The French list seems most different from the others: The
 311 word “disgusting/bad” was in the top 10 for all female groups except France, and references to
 312 “fat/fatty” were absent only from the French list (Table 1). If we classify “fat/fatty”,
 313 “death/violence”, and “disgusting/bad” as the only clearly negative words (“blood” is
 314 questionable), France is the only country in which no negative words appeared in the top 10.

315 (Table 1 about here)

316 **Ambivalence Toward Beef**

317 We categorized participants into four mutually exclusive groups on the basis of the
 318 values they assigned to each of their three free associations: 1) *Ambivalent*– Provided at least one
 319 negative and one positive value; 2) *Positive*– Provided at least one positive, and NO negative
 320 values; 3) *Negative*– Provided at least one negative, and NO positive value; 4) *Neutral*: Provided
 321 only neutral values. We also summed the values for the three words to create a general beef
 322 valence score.

323 Beef ambivalence was most common in Brazilian women (42.5%) and men (29.6%), and
 324 least common in Argentine (14.0%) and American (18.6%) men.

325 We ran a series of binomial logistic regressions of gender (Woman 0 / Man 1) within
 326 each culture, predicting ambivalence in spontaneous associations with beef (No = 0, Yes = 1).
 327 The regressions revealed that women were more likely than men to hold ambivalent attitudes to
 328 beef in Brazil [$B = 0.56$, $Wald(1) = 9.68$, $p < .01$], but not in Argentina, [$B = 0.71$, $Wald(1) =$
 329 2.66 , $p = .10$], France [$B = 0.10$, $Wald(1) = 0.17$, $p = .68$], or the USA [$B = 0.30$, $Wald(1) = 1.19$,
 330 $p = .28$].

331 Next, we ran a logistic regression within each gender, examining the effect of culture
 332 with dummy codes for each culture. Ambivalence was more prevalent among Brazilian women
 333 than among Argentine [$B = 0.81$, $Wald(1) = 20.05$, $p < .001$], French [$B = 1.04$, $Wald(1) = 31.93$,
 334 $p < .001$], and American women [$B = 0.88$, $Wald(1) = 22.12$, $p < .001$]. The same pattern also
 335 emerged among men, such that ambivalence was more prevalent among Brazilian men than
 336 among Argentine [$B = 0.95$, $Wald(1) = 4.80$, $p < .03$], French [$B = 0.57$, $Wald(1) = 5.46$, $p < .02$],
 337 and American men [$B = 0.61$, $Wald(1) = 5.11$, $p < .03$]. (See Table 2.)

338 **Positivity Toward Beef**

339 Beef positivity was most common in Argentine (82.0%) and French (71.9%) men, and
340 least common in Brazilian (40.0%) and American women (44.1%).

341 A series of logistic regressions revealed that men were more likely than women to hold
342 positive attitudes to beef in Argentina [$B = 1.20$, $Wald(1) = 9.48$, $p < .01$], Brazil, [$B = 0.63$,
343 $Wald(1) = 13.37$, $p < .001$], France [$B = 0.57$, $Wald(1) = 7.22$, $p < .01$], and the USA [$B = 0.79$,
344 $Wald(1) = 12.45$, $p < .001$] (see Table 2)

345 Positivity was more prevalent among French women than among Brazilian [$B = 0.78$,
346 $Wald(1) = 20.49$, $p < .001$], and American women [$B = 0.61$, $Wald(1) = 11.41$, $p < .001$], and
347 also more positive among Argentine women than among Brazilian [$B = 0.72$, $Wald(1) = 18.86$, p
348 $< .001$], and American women [$B = 0.55$, $Wald(1) = 9.25$, $p < .01$]. A similar pattern also
349 emerged among men, such that positivity was more prevalent among French men than Brazilian
350 [$B = 0.71$, $Wald(1) = 10.61$, $p < .001$], and also more positive among Argentine men than among
351 Brazilian [$B = 1.29$, $Wald(1) = 10.85$, $p < .001$], and American men [$B = 0.96$, $Wald(1) = 5.45$, p
352 $< .02$].

353 **Negativity Toward Beef**

354 Beef negativity was most common in American (25.2%) and Brazilian (16.4%) women,
355 and least common in Argentine (4.0%) and French men (6.0%).

356 A series of logistic regressions revealed that women were more likely than men to hold
357 negative attitudes to beef in Argentina [$B = 1.50$, $Wald(1) = 4.09$, $p < .05$], France, [$B = 0.99$,
358 $Wald(1) = 7.19$, $p < .01$], and the USA [$B = 1.39$, $Wald(1) = 14.77$, $p < .001$], but not Brazil [$B =$
359 0.16 , $Wald(1) = 0.43$, $p = .51$].

360 Negativity was more prevalent among American women than among Argentine [$B =$
361 0.59 , $Wald(1) = 6.69$, $p < .01$], Brazilian [$B = 0.54$, $Wald(1) = 6.90$, $p < .01$], and French women
362 [$B = 0.68$, $Wald(1) = 8.94$, $p < .01$]. Among men, negativity was more prevalent among Brazilian
363 men than French men [$B = 0.97$, $Wald(1) = 6.55$, $p < .02$]. (See Table 2.)

364 **Neutrality Toward Beef**

365 Neutral attitudes constitute the remainder after assigning positivity, negativity and
366 ambivalence, and were well below the levels for negative and positive associations, with the
367 range only 0 to 10.1% across all eight groups (see Table 2).

368 (Table 2 about here)

369 Valence of Associations Toward Beef

370 For the valence measure, the maximum positive score is 3.0 (3 positive associations) and
371 the minimum negative score is -3.0 (3 negative associations). Argentine (2.04) and French men
372 (1.56) were most positive toward beef, and American (0.46) and Brazilian (0.69) women were
373 least positive.

374 A two-way (Gender x Country) ANOVA revealed a significant effect of gender, such that
375 men had significantly more positive associations to beef than did women, $F(1, 1687), = 42.68, p$
376 $< .001, d = .67$. The effect of country was also significant, $F(3, 1687) = 10.42, p < .001$, such that
377 valence was significantly higher in Argentina and France than in the USA and Brazil. The
378 interaction of gender and country was not significant, $F(3, 1687) = 1.32, p = .27$. For a
379 comprehensive overview of all means and significant differences for this and all subsequent
380 quantitative measures, see Table 3.

381 (Table 3 about here)

382 Liking of Beef

383 Liking of beef (0-100 scale) was highest in French (77.88) and Argentine men (77.32),
384 and lowest in American (48.70) and Brazilian (58.27) women.

385 A two-way (Gender x Country) ANOVA revealed a significant effect of gender, such that
386 men liked beef significantly more than did women, $F(1, 1682), = 133.13, p < .001, d = .59$. The
387 effect of country was also significant, $F(3, 1682) = 13.96, p < .001$, such that liking was greatest
388 in France and Argentina, followed by Brazil, then the USA. The interaction of gender and
389 country was not significant, $F(3, 1682) = 1.42, p = .23$.

390 Desire to Eat Beef

391 Desire to eat beef was most frequent in French (1.96) and American (1.93) men, and least
392 frequent in Argentine (1.43) and Brazilian women (1.48).

393 There was a significant effect of gender, such that men desired beef significantly more
394 often than did women, $F(1, 1687), = 31.52, p < .001, d = .35$. The effect of country was also
395 significant, $F(3, 1687) = 10.30, p < .001$, such that desire was significantly less in Brazil and
396 Argentina than in the USA and France. The interaction of gender and country was not
397 significant, $F(3, 1687) = 1.07, p = .36$.¹ We note a mismatch between liking, relatively high in
398 Argentines, and desire, below average in Argentines.

399

400 Beef Consumption

401 Frequency of beef consumption (times per month) was highest among Brazilian (25.68)
402 and Argentine (19.71) men, and lowest among American (5.97) and French (9.03) women.

403 There was a significant effect of gender, such that men consumed beef significantly more
404 often than did women, $F(1, 1684) = 53.17, p < .001, d = .34$. The effect of country was also
405 significant, $F(3, 1684) = 123.27, p < .001$, such that consumption was highest in Brazil, followed
406 by Argentina, then the USA, and finally France, with every country significantly different from
407 the other. The main effects were qualified by a significant interaction of gender and country, $F(3,$
408 $1684) = 2.88, p < .04$. Analysis of simple effects revealed that men ate beef significantly more
409 frequently than did women in Brazil [$F(1, 581) = 14.08, p < .001, d = .32$], France [$F(1, 437) =$
410 $38.02, p < .001, d = .61$], and the USA [$F(1, 364) = 53.50, p < .001, d = .80$], but not in
411 Argentina [$F(1, 302) = 0.04, p = .85, d = .03$].

412 Admiration of Vegetarians

413 Admiration of vegetarians was highest in Brazilian (0.62) and American (0.56) women,
414 and lowest in French men (-1.68) and women (-1.35). Notably, only the top two groups had a
415 mean score above neutral, indicating that participants did not particularly admire vegetarians.

416 There was a significant effect of gender, such that women admired vegetarians
417 significantly more than did men, $F(1, 1687) = 44.71, p < .001, d = .31$. The effect of country
418 was also significant, $F(3, 1687) = 124.06, p < .001$, such that admiration of vegetarians was
419 highest in the USA and Brazil, followed by France, then finally Argentina. The interaction of
420 gender and country was not significant, $F(3, 1687) = 1.17, p = .32$.

421 Being Bothered by Vegetarians

422 American (-0.74) and French (-1.29) men were most bothered by vegetarians, and
423 Argentine women (-2.08) and men (-1.98) were least bothered. Notably, no groups had a mean
424 score above neutral, indicating that participants were not especially bothered by vegetarians.

425 There was a significant effect of gender, such that women were bothered by vegetarians
426 significantly less than were men, $F(1, 1685) = 36.39, p < .001, d = .31$. The effect of country
427 was also significant, $F(3, 1685) = 14.38, p < .001$, such that the Argentines were least bothered,
428 followed by the Brazilians and the French, and finally the Americans. The interaction of gender
429 and country was not significant, $F(3, 1685) = 2.08, p = .10$.

430

431 **Aversion to Dating Vegetarians**

432 American (0.05) and French (0.02) men were most averse to dating vegetarians, and
433 Argentine women (-1.53) and men (-1.20) least averse. Notably, the most averse groups were
434 just above the neutral point of the scale, indicating that participants were not especially averse to
435 dating vegetarians.

436 There was a significant effect of gender, such that women were less averse to dating
437 vegetarians than were men, $F(1, 1686) = 8.55, p < .01, d = .15$. The effect of country was also
438 significant, $F(3, 1686) = 36.35, p < .001$, such that the Argentines were least averse, followed by
439 the Brazilians, and finally the Americans and the French. The interaction of gender and country
440 was not significant, $F(3, 1686) = 2.08, p = .10$.

441 **Relationship Between Beef and Vegetarian Measures**

442 All variables (beef valence, beef liking, beef consumption, admire vegetarians, bothered
443 by vegetarians, aversion to dating vegetarians) were significantly correlated with one another at p
444 $< .001$, with the exception of beef consumption and aversion to dating vegetarians, which was
445 correlated at $p < .05$. Perhaps unsurprisingly, the strongest correlations were between beef liking
446 and the other three beef measures—beef valence ($r = .56$), beef desire ($r = .43$), and beef
447 consumption ($r = .44$). The vegetarian items were correlated less strongly with one another, with
448 bothered by vegetarians and aversion to dating vegetarians correlated at $r = .53$, but admire
449 vegetarians only correlating moderately with bothered ($r = -.36$) and aversion to dating ($r = -.38$).
450 Although all measures of attitudes toward beef were significantly correlated with attitudes
451 toward vegetarians, the strongest predictive power emerged from beef liking (admire $r = -.36$;
452 bothered $r = .26$; aversion to dating $r = .31$). The same general pattern emerges if one conducts
453 analyses within gender, or within country (with and without controlling for gender), although
454 correlations are higher among women than among men, and within the USA than within the
455 other 3 countries (see Table 4).

456 (Table 4 about here)

457 **Discussion**

458 Meat is one of the basic foods eaten by many people, and, in the Western world, beef is
459 often the most favored member of this group. At the same time, it is one of the most difficult to
460 produce foods, with considerable ethical and environmental ramifications, making it important to
461 understand how people relate to it. Beef is associated with weight gain (energy density),

462 increased incidence of some degenerative diseases, and ethical issues about the mistreatment and
463 killing of animals and damage to the environment. In their spontaneous free associations,
464 participants displayed both strong positive and negative attitudes toward beef. Although “tasty”
465 was in the top ten for 8/8 groups, and “juicy” in the top ten for 5/8 groups, “fat/fatty” was present
466 in 5/8, blood/bloody in 5/8, and “disgusting” in 4/8. Concern for ethical issues was far less
467 prevalent, with “death/violence” only emerging in the two Brazilian groups. Concerns about
468 eating beef, primarily regarding disgust and fat, appear more reliably among women (except in
469 France), perhaps because in France, people associate food more with pleasure than with health
470 (see Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999). Negativity toward beef was
471 relatively low, with the exception of American women (25.2%). Overall, it is only a minority
472 (about 25%) who express ambivalence in their thoughts about beef, although this is substantially
473 higher among Brazilian women (42%). Ambivalence may be of particular significance because
474 changes in beef attitudes, and consumption, are probably most likely in ambivalent individuals.

475 The liking of beef, a central food in all of the countries studied, is very robust— among
476 women, liking ranges from 48 to 61 (of 100), and among men, even higher (68-78). Consistent
477 gender effects emerged across all beef-related variables— relative to men, women reported fewer
478 positive free associations toward beef, held more ambivalent and fewer positive attitudes, and
479 liked and desired beef less than did men. In every country but Brazil, they held more negative
480 attitudes toward beef, and in every country but Argentina, they also ate beef less frequently than
481 did their male peers.

482 Turning to attitudes toward vegetarians, overall, women were more positively inclined
483 than were men, admiring them more in all four cultures. That said, these attitudes were
484 predominantly neutral, with only Brazilian and American women having group means above the
485 midpoint of the admiration scale. Furthermore, women in France and the USA were less
486 bothered by vegetarians than were men, and there were no significant gender differences in
487 willingness to date vegetarians.

488 At the country level, admiration of vegetarians was highest in Brazil and the USA.
489 Argentine and Brazilian participants were bothered least by vegetarians, and French participants
490 were bothered most, perhaps because, unlike the other groups, the French have a very old and
491 well-defined national cuisine that is a large part of their identity, and vegetarians could be seen
492 as a threat to this identity. That said, all groups were below the mean of the scale, indicating that

493 most people did not find vegetarians particularly bothersome. Similarly, Argentine and Brazilian
494 participants were least averse to dating vegetarians.

495 Our four beef variables (valence, liking, desire, and consumption) correlated positively
496 with one another in all six cases in each of the four cultures (see Table 4). Among the highest
497 correlations we report are between beef valence and beef liking (in the .50 -.58 range). These
498 high correlations suggest that the valence of free associations is a good measure of liking for
499 beef. There is evidence for some coherence of our three measures of attitudes to vegetarians,
500 although the results suggest that vegetarian admiration does not relate to any other measures in
501 France.

502 The findings we report here are just a start, and have their limitations. First, although we
503 sampled from a diverse array of cultural contexts, our sample is composed of college students,
504 who are not representative of a country as a whole. Furthermore, our sample of Argentine men is
505 rather small (N=52), so findings regarding this particular group should be interpreted with
506 caution. Finally, it is possible that the participants from France, who were students at a business
507 school, may hold more conservative views toward beef, and toward vegetarians, than students of
508 other disciplines. As such, these findings should be followed up with investigations in more
509 representative samples, in a broader array of countries, where eating beef is more taboo (e.g.,
510 India, Nepal), and in countries where vegetarianism is relatively common (e.g., India, Germany),
511 and where it is virtually nonexistent (e.g., Mongolia, hunter-gatherer societies).

512 Our results suggest that there is a significant relationship between gender and attitudes
513 toward beef, with men being more positively inclined. Furthermore, there also appear to be
514 country-level differences. The Argentines and French had the most positive free associations
515 toward beef, and greatest liking for it, across genders. While the Argentines are by far the biggest
516 beef consumers, the French have the lowest intake, while being close to Argentines in liking for
517 beef. The high liking but relatively low intake in the French probably results from a number of
518 factors, including a greater role for fruits, vegetables and grains (e.g., bread) in France, and a
519 generally lower food intake (see Rozin et al., 1999). The moderation characteristic of the French
520 in the food domain seems to extend to beef intake. However, perhaps due to the pride of the
521 French in their food, the French emerge as the most hostile to vegetarians. Just as the French
522 have the least positive attitudes toward vegetarians, the American women have the most negative
523 attitudes toward beef.

524 The present work adds to the small but growing body of literature on how people think
525 about meat and vegetarians in different cultural settings (e.g., Beardsworth et al., 2002; Fessler &
526 Navarrete, 2003; Kubberød, Ueland, Tronstad, & Risvik, 2002; Lea & Worsley, 2002; Rousset et
527 al., 2005; Ruby, Heine, Kamble, Cheng, & Waddar, 2013). Given the shifting popularity of meat
528 (and beef in particular) in the developed and developing world, and growing concern about the
529 impact of meat consumption on issues of health, food security, and environmental sustainability
530 (e.g., Pew Commission, 2008; Steinfeld et al., 2006; Roberts, 2008), it is especially important to
531 understand attitudes toward meat and toward vegetarians. Outside of North America and
532 Western Europe, the field still knows little about these areas (for a review, see Ruby, 2012), and
533 this study helps address this knowledge gap by exploring these topics in Brazil and Argentina.

534

535

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539

Footnotes

540 1. Because the differences between the levels of desire to eat beef are not equal, these data are
541 technically ordinal, not ratio. Although many researchers perform ANOVAs on ordinal data, one
542 should technically use nonparametric statistics. If we instead analyzed these data with a
543 Kruskal-Wallis H Test, our inferences remain largely unchanged, save that the gender difference
544 within the Argentine sample becomes significant.

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Table 1. Free associations to “beef”.

Rank	Argentina		Brazil		France		USA	
	Women	Men	Women	Men	Women	Men	Women	Men
1	Asado (BBQ) 36	Asado (BBQ) 17	Gostosa/Saborosa/ Bom (Tasty) 66	Churrasco (BBQ) 39	Viande (Meat) 128	Viande (Meat) 68	Cow 52	Cow 27
2	Rojo (Red) 31	Rico/Gostoso (Tasty) 7	Churrasco (BBQ) 64	Gostosa/Saborosa/ Bom (Tasty) 30	Steak (Steak) 23	Steak (Steak) 25	Meat 24	Steak 18
3	Rico/Gostoso (Tasty) 29	Vaca (Cow) 5	Sangue (Blood) 43	Sangue (Blood) 25	Rouge (Red) 22	Vache (Cow) 17	Hamburger 22	Meat 15
4	Comida (Food) 19	Grasa/Grasosa (Fat/ty) 3	Suculenta (Juicy) 18	Proteína (Protein) 17	Vache (Cow) 20	Sang/Saignant (Blood/y) 8	Eww/Gross/ Yuck 19	Hamburger 7
5	Jugoso (Juicy) 12	Jugoso (Juicy) 3	Nojo/Ruim (Disgust/Bad) 18	Vaca/Boi (Cow/Ox) 15	Animal (Animal) 12	Rouge (Red) 5	Red 18	Red 7
6	Animal(es) Animal(s) 9	Milanesa (Cutlet) 3	Gordura/Gordurosa (Fat/Fatty) 16	Picanha (Steak) 11	Sang/Saignant (Blood/y) 11	Côte (Rib) 4	Steak 15	Protein 5
7	Asco (Disgusting) 9	-	Proteína (Protein) 14	Suculenta (Juicy) 10	Bourguignon (Bourguignon) 7	Délicieux/Miam (Delicious/Yum) 4	Tasty/Delicious /Good 12	Tasty/Delicious /Good 4
8	Nutritiva/Sana (Nutritious/Healthy) 9	-	Vaca/Boi (Cow/Ox) 12	Bife (Beef) 5	Bon/Miam (Good/Yum) 6	Bourguignon (Bourguignon) 3	Fat/Fatty 10	Fat/Fatty 4
9	Proteínas (Protein) 9	-	Picanha (Steak) 9	Gordura/Gordurosa (Fat/Fatty) 4	Oeuf (Egg) 4	Gros (Big) 3	Juicy/Saucy 6	Jerky 3
10	Sangre (Blood) 7 Milanesa (Cutlet) 7	-	Morte/Violencia (Death/Violence) 8	Morte/Violencia (Death/Violence) 4	Hamburger (Hamburger) 3	-	Food 4 Jerky 4	Savory 3

Table 2. Percent of people with ambivalent, positive, and negative free associations to “beef”.

Gender	Country	N	Ambivalent	Positive	Negative
Women	Argentina	254	24.8 b	57.9 a *	15.7 b *
	Brazil	360	42.5 a *	40.0 b *	16.4 b
	France	274	20.8 b	59.1 a *	14.6 b *
	USA	367	23.5 b	44.1 b *	25.2 a *
Men	Argentina	50	14.0 b	82.0 a *	4.0 b *
	Brazil	223	29.6 a *	55.6 c *	14.3 ab
	France	167	19.2 b	71.9 ab *	6.0 bc *
	USA	129	18.6 b	63.6 bc *	7.8 b *

Note: Comparing across gender within country, percentages marked with a * differ at $p < .05$ or lower. Comparing across countries within gender, percentages that do not share subscripts differ at $p < .05$ or lower.

Table 3. Attitudes toward beef, beef intake, and attitudes toward vegetarians (means and standard deviations).

Gender	Country	N	Beef Valence	Beef Liking	Beef Desire	Beef Consumption (times/month)	Admire Vegetarians	Bothered by Vegetarians	Not Date Vegetarians
Entire Sample	Argentina	304	1.24 (1.71) a	61.69 (26.31) b	1.47 (0.81) b	19.36 (14.13) b	-0.22 (1.30) b	-2.07 (1.45) c	-1.48 (1.67) c
	Brazil	583	0.86 (1.86) b	63.08 (29.11) b	1.53 (0.86) b	22.61 (15.74) a	0.38 (1.87) a	-1.60 (1.76) b	-0.79 (2.09) b
	France	441	1.19 (1.55) a	67.79 (23.71) a	1.79 (0.94) a	11.30 (10.25) c	-1.47 (1.61) c	-1.67 (1.57) b	-0.10 (2.06) a
	USA	367	0.74 (1.70) b	55.56 (30.04) c	1.70 (0.86) a	8.54 (9.81) d	0.30 (1.64) a	-1.18 (1.58) a	-0.13 (1.88) a
Women	Argentina	254	1.08 (1.77)	58.58 (26.29)	1.43 (0.80)	19.29 (14.83)	-0.13 (1.21)	-2.08 (1.45)	-1.53 (1.68)
	Brazil	360	0.69 (1.85)	58.27 (29.51)	1.48 (0.81)	20.70 (15.21)	0.62 (1.79)	-1.71 (1.68)	-0.79 (2.11)
	France	274	0.97 (1.60)	61.64 (25.27)	1.69 (0.87)	9.03 (7.50)	-1.35 (1.64)	-1.91 (1.41)	-0.17 (2.13)
	USA	367	0.46 (1.75)	48.70 (30.13)	1.58 (0.76)	5.97 (6.74)	0.56 (1.55)	-1.42 (1.53)	-0.22 (1.88)
Men	Argentina	50	2.04 (1.11)	77.32 (17.49)	1.66 (0.84)	19.71 (9.95)	-0.74 (1.59)	-1.98 (1.42)	-1.20 (1.62)
	Brazil	223	1.14 (1.86)	70.80 (26.77)	1.62 (0.94)	25.68 (16.13)	-0.01 (1.92)	-1.43 (1.86)	-0.77 (2.07)
	France	167	1.56 (1.40)	77.88 (16.58)	1.96 (1.02)	15.00 (12.77)	-1.68 (1.55)	-1.29 (1.73)	0.02 (1.96)
	USA	129	1.26 (1.48)	68.22 (25.49)	1.93 (0.99)	13.32 (12.51)	-0.19 (1.70)	-0.74 (1.58)	0.05 (1.65)

Note: For all variables, was a significant gender difference at $p < .05$ or lower, such that men were more positive toward meat, and less positive toward vegetarians. Country-level means that do not share subscripts differ at $p < .05$ or lower.

Table 4. Correlations between beef attitudes/consumption and attitudes toward vegetarians.

Entire Sample	1	2	3	4	5	6	7
1. Beef Valence	-						
2. Beef Liking	.56***	-					
3. Beef Desire	.26***	.43***	-				
4. Beef Consumption	.25***	.44***	.22***	-			
5. Admire Vegetarians	-.28***	-.36***	-.21***	-.11***	-		
6. Bothered By Vegetarians	.16***	.26***	.21***	.12***	-.36***	-	
7. Not Date Vegetarians	.18***	.31***	.23***	.06*	-.38***	.53***	-
Argentina	1	2	3	4	5	6	7
1. Beef Valence	-						
2. Beef Liking	.50***	-					
3. Beef Desire	.14*	.36***	-				
4. Beef Consumption	.23***	.42***	.12*	-			
5. Admire Vegetarians	-.09	-.22***	-.11	-.19**	-		
6. Bothered By Vegetarians	.00	.16**	.14*	.13*	-.25***	-	
7. Not Date Vegetarians	.02	.20***	.16**	.08	-.17**	.52***	-
Brazil	1	2	3	4	5	6	7
1. Beef Valence	-						
2. Beef Liking	.54***	-					
3. Beef Desire	.19***	.42***	-				
4. Beef Consumption	.29***	.55***	.33***	-			
5. Admire Vegetarians	-.32***	-.39***	-.19***	-.27***	-		
6. Bothered By Vegetarians	.16***	.26***	.12**	.18***	-.50***	-	
7. Not Date Vegetarians	.21***	.34***	.20***	.20***	-.47***	.54***	-
France	1	2	3	4	5	6	7
1. Beef Valence	-						
2. Beef Liking	.53***	-					
3. Beef Desire	.31***	.40***	-				
4. Beef Consumption	.17***	.29***	.26***	-			
5. Admire Vegetarians	-.13**	-.20***	-.12*	.01	-		
6. Bothered By Vegetarians	.20***	.20***	.19***	.06	-.27***	-	
7. Not Date Vegetarians	.15**	.25***	.20***	.07	-.27***	.54***	-
USA	1	2	3	4	5	6	7
1. Beef Valence	-						
2. Beef Liking	.58***	-					
3. Beef Desire	.38***	.47***	-				
4. Beef Consumption	.32***	.46***	.46***	-			
5. Admire Vegetarians	-.36***	-.40***	-.26***	-.28***	-		
6. Bothered By Vegetarians	.24***	.37***	.32***	.23***	-.54***	-	
7. Not Date Vegetarians	.36***	.44***	.24***	.20***	-.52***	.50***	-

Note: * $p < .05$, * $p < .01$, *** $p < .001$. Correlations in the entire sample are standard Pearson correlation coefficients; those given separately by country partial out the effects of gender.